Jan. 13, 1953 A. J. DUFOURD ET AL 2,625,183

LOOM SHUTTLE BOX WITH ELECTRIC SWITCH LOOM CONTROL

Filed Nov. 28, 1951

Fig. 1.

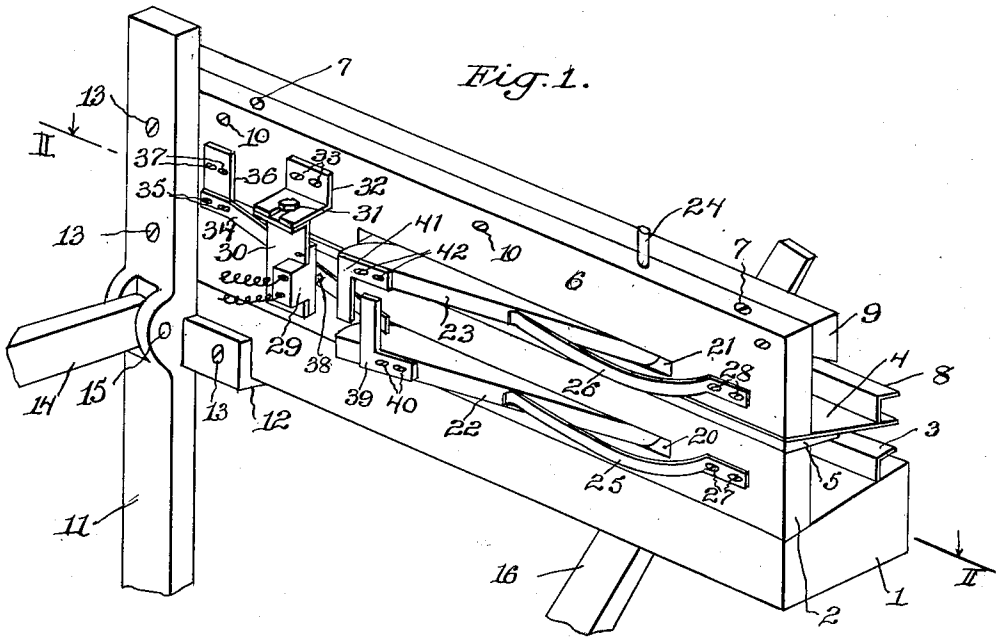


Fig. 2.

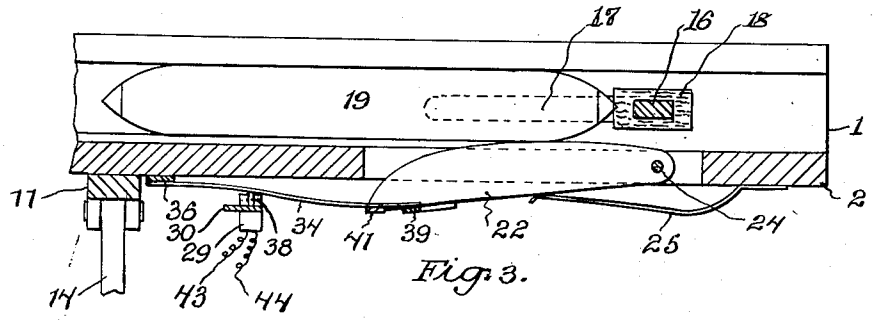
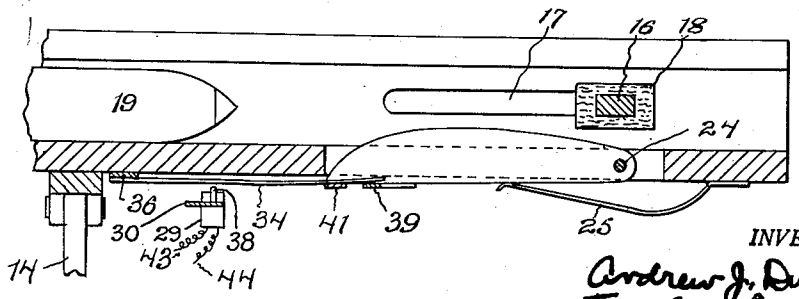


Fig. 3.



INVENTOR.

Andrew J. Dufourd
Frank A. Lyschin
by Brock Durand
their Attorneys

Patented Jan. 13, 1953 2,625,183

UNITED STATES PATENT OFFICE

2,625,183

LOOM SHUTTLE BOX WITH ELECTRIC SWITCH LOOM CONTROL

Andrew J. Dufourd, Los Angeles, Calif., and Frank A. Lovshin, Shelton, Conn., assignors to Sidney Blumenthal & Co., Inc., New York, N. Y., a corporation of New York

Application November 28, 1951, Serial No. 258,612

10 Claims. (Cl. 139—341)

1

This invention relates to a loom shuttle box with electric switch control, and has for an object to provide a shuttle box construction, particularly designed for double shuttle looms, which embodies an electric switch so arranged as to be subject to the operation of either the upper or lower shuttle, the said switch being adapted for connection with means for stopping the electric drive of the loom in case either the upper or lower shuttle fails properly to enter its box during the weaving operation of the loom.

Another object is to provide such a shuttle box construction which is adaptable to installation in double shuttle looms of standard or approved types without requiring reconstruction.

Another object is to provide such a shuttle box construction which is notably simple and economical to manufacture, and which reduces the cost of operative maintenance of the loom.

Another object is to provide such a shuttle box construction which lessens the number of parts required for the desired functioning and tends towards simplicity in loom setup while adapting itself readily to adjustment.

A further object is to provide certain improvements in the form, construction and arrangement of the parts whereby the above named objects, and others inherent in the invention, may be effectively attained.

A practical embodiment of the invention is shown in the accompanying drawing, in which

Fig. 1 represents a perspective view of the left hand upper and lower shuttle boxes and associated parts of a double shuttle loom with the present invention embodied therein;

Fig. 2 represents a horizontal section taken in the plane of the line II—II of Fig. 1, looking in the direction of the arrows, with a shuttle housed in the box in contact with the picker; and

Fig. 3 represents a similar view with the shuttle just entering the box and certain parts in different positions.

It has for a long time been common practice in loom construction to incorporate means for stopping the loom in the event that a shuttle fails properly to enter its box, in order to prevent injury to the shuttle and/or yarn being woven as the result of the striking of the same by the reciprocating lay. This means has usually included one or more movable daggers carried by the lay in position to contact one or more blocks or frogs fixed to the loom frame, which contact serves to stop the loom by what is commonly referred to as a "bang off." To avoid such stoppage while the loom is operating satisfactorily

2

with the shuttles properly entering their boxes, mechanism, generally including bell cranks and rods, has been associated with one or more of the shuttle boxes, which mechanism lifts the dagger or daggers out of contact relationship with the block or frog on each forward or beat-up stroke of the lay as long as the shuttles are properly entering their boxes. It will be clear that the arrangement just described necessarily involves complication in loom structure and need for additional power in operation, and also increases the probability of failure or faulty operation due to the increase in number of moving parts.

An advance over this commonly used mechanism has consisted in the provision of electrical means for stopping the loom drive motor when a shuttle fails properly to enter its box, the said means being controlled by a switch associated with each shuttle box in a position to be actuated by contact with the incoming shuttle; or being controlled by electric or magnetic impulses generated by the incoming properly running shuttle. Examples of these last named arrangements are disclosed in United States Patent to Francis J. Sullivan and Arthur R. Abbott numbered 2,499,887, issued March 7, 1950, and United States Patent to Arthur R. Abbott numbered 2,556,785, issued June 12, 1951.

The present invention involves a double shuttle box with electric controlling means, such as a switch, subject to the action of either shuttle upon entering the box and adapted to stop the loom through any suitable electric, electromagnetic or electronic arrangement, by rendering the loom drive motor ineffective through interrupting the circuit thereto or disengaging the motor from the loom as, for instance, by declutching it, or by activating mechanical stopping means, or in other suitable manner.

Turning now to the drawing, the bottom of a lower left hand shuttle box, which may be composed of wood or any other suitable material, is denoted by 1, and the back of said box, which may also be composed of wood or other appropriate material and suitably fastened to the bottom, is marked 2. The front of the said box is indicated by 3 and may consist of a piece of angle iron set into or otherwise adequately fastened to the bottom 1. The bottom of the upper box is marked 4 and is preferably composed of a piece of sheet metal supported by a tapered filler strip 5, both the said bottom and filler resting on top of the back 2 of the lower box and being clamped thereto by the back 6 of the upper box,

the said parts being secured in position by long screws 7. The filler strip 5 is desirably composed of fibre, or the like, and its tapered or wedge shape provides for aligning or positioning the bottom 4 of the upper box in order properly to conform to the shape of the shuttle. The front of the upper box is marked 8. It is similar to the front 3 of the lower box and may be secured to its bottom 4 in any convenient manner, such as tongue and slot, and/or brazing, and/or screws. The top of the upper box is denoted by 9. It, like the back, may be composed of wood, and be fastened to the said back by screws 10, or the like.

The double box is carried, as usual, by a lay sword 11 and a supporting bracket 12, the parts being fastened together by screws 13, while the customary pitman 14 is pivoted to the sword at 15 for reciprocating the latter, and the usual picker stick 16 traverses a slot 17 in the bottom of the lower box and a similar slot (not shown) in the bottom of the upper box, and is provided with a pair of pickers, the lower of which is shown and marked 18, for driving the shuttles, one of which is shown and marked 19.

The backs of the lower and upper boxes are formed with the usual slots 20, 21, for housing the shuttle binders or arresters 22, 23, which are pivotally mounted at their right hand ends on a pin 24 set in the backs of the boxes. Leaf springs 25 and 26 are fixed by screws 27 and 28 to the backs of the lower and upper boxes respectively, the free ends of the said springs bearing upon the binders or arresters 22, 23, so as normally to urge the latter toward the front of the shuttle boxes.

A single pole contact switch 29 is fixed to a hanger 30 and has a bolt and slot engagement 31 with an angle bracket 32 that is secured by screws 33 to the back 6 of the upper shuttle box, whereby the said switch is supported in position and adapted for adjustment toward and away from the backs of the boxes. A switch activator in the form of a leaf spring 34 has one end fixed by screws 35 to a plate 36 that is attached by screws 37 to the back 6 of the upper shuttle box, the said spring 34 being in position to bear against plunger or button 38 of the switch 29 and being biased toward the said plunger or button.

An upwardly extending finger 39 is secured to the free end of the binder or arrester 22 by screws 40, and a similar but downwardly extending finger 41 is fastened to the free end of binder or arrester 23 by screws 42. These fingers are arranged to project into the path of movement of spring 34 so that, both the said binders or arresters, being urged inwardly of the shuttle boxes by their respective springs 25 and 26, normally hold the spring 34 out of contact with switch plunger or button 38, as illustrated in Fig. 3, which position of the said parts exists at all times except when both shuttles are housed in their boxes, as illustrated in the case of one shuttle in Fig. 2. Conducting wires 43, 44, lead from switch 29 for connection with an electric control, or the like, of the loom drive, as hereinbefore explained.

In operation, when the shuttles are not housed in the boxes, the binders or arresters 22, 23, are urged inwardly by their springs 25, 26, to the position represented in Fig. 3 and carry with them the switch activating spring 34 due to contact of fingers 39, 41, therewith, so that the said spring 34 is moved away from the switch plunger or button 38 and the latter is permitted to move to its outer or open switch position under the influence of the usual spring (not shown) embodied in the switch. This same position of the spring 34 and plunger or button 38 exists when either shuttle is absent from its box, because either finger 39 or 41 can move spring 34 inwardly due to the fact that each spring 25 or 26 is more powerful than spring 34. When, however, both shuttles enter their boxes and are housed properly therein, as shown in Fig. 2, their contact with binders or arresters 22, 23, swings the latter outwardly from the shuttle boxes and permits spring 34 to contact plunger or arrester 38 and move it to closed switch position, in which position spring 34 contacts the body or casing of switch 29, thus lessening its pressure upon the plunger or button 38 and, consequently, upon the switch mechanism, while permitting an adequate effect upon the plunger or button for holding the switch closed. It will thus be clear that as long as both shuttles are being properly housed during loom operation, the switch 29 will be closed at the instant of shuttle boxing and will remain closed until the shuttles are picked from the boxes, at which latter instant the inward movement of the binders or arresters will move spring 34 away from plunger or button 38 and permit the switch 29 to open. If, however, either shuttle fails properly to enter its box, its binder or arrester will not be moved outwardly and the finger 39 or 41 carried thereby will hold spring 34 away from plunger or button 38 and leave switch 29 open. This, of course, will also be true if both shuttles should fail properly to enter their boxes.

The switch 29 may be connected by its wires 43, 44, with any appropriate means for stopping the loom, as hereinabove explained, when the switch 29 is left open due to the failure of either shuttle to be properly boxed. As long, however, as both shuttles are properly boxed they will close the switch and prevent activation of the loom stopping arrangement. As operation means for controlling the drive of the loom motor are set forth in both of the patents numbered 2,499,837 and 2,556,785, hereinabove cited, and as various other means for loom stoppage are known to those skilled in this industrial field, there is considered to be no occasion herein further to describe or to illustrate the same, but it may be noted that such means includes an arrangement whereby the open condition of the switch during the flights of the shuttles through the sheds from box to box is without effect upon loom operation.

It should be emphasized that the present invention supplies an arrangement in which a single controlling switch cooperates with either or both shuttle boxes, thus eliminating the necessity of a separate control switch, or the like, for each box and materially simplifying and economizing the construction and operation. Likewise, it should be noted that the arresters or binders 22, 23, do not directly contact the switch plunger or button 38 so that, no matter with what force the incoming shuttles strike the binders, the said force is not applied to the switch, thereby avoiding the likelihood of injury to the latter. The maximum force that can be applied to the switch plunger or button is the strength of bias of spring 34 which latter is preferably fixed at a minimum consonant with reliable actuation. Furthermore, as previously mentioned, the said spring contacts the casing of the switch after it has forced the plunger or button into

closed position so as to lessen the actual spring pressure on the plunger or button.

It will be understood that various changes may be resorted to in the form, construction, arrangement and material of the several parts without departing from the spirit or scope of the invention, and hence we do not intend to be limited to details herein shown or described except as the same may be included in the claims or be required by disclosures of the prior art.

What we claim is:

1. A shuttle box construction for double shuttle looms comprising, upper and lower shuttle boxes, a movable shuttle binder for each box biased to move inwardly thereof into the shuttle path, a loom control switch associated with the boxes, and means operable by either binder for governing the said switch.

2. A shuttle box construction for double shuttle looms comprising, upper and lower shuttle boxes, a movable shuttle binder for each box biased to move inwardly thereof into the shuttle path, a loom control switch associated with the boxes, a switch activator, and means operable by either binder for governing the switch activator.

3. A shuttle box construction for double shuttle looms comprising, upper and lower shuttle boxes, a movable shuttle binder for each box biased to move inwardly thereof into the shuttle path, a loom control switch associated with the boxes, a switch activator, and means carried by both binders for governing the switch activator.

4. A shuttle box construction for double shuttle looms comprising, upper and lower shuttle boxes, a movable shuttle binder for each box biased to move inwardly thereof into the shuttle path, a loom control switch associated with the boxes, a switch activator biased to move outwardly of the boxes, and means carried by both binders for limiting the outward movement of the switch activator and preventing activation of the switch when a shuttle fails properly to enter either box.

5. A shuttle box construction for double shuttle looms comprising, upper and lower shuttle boxes, a movable shuttle binder for each box biased to move inwardly thereof into the shuttle path, a loom control switch associated with the boxes, a switch activator biased to move outwardly of the boxes, and means carried by both binders for limiting the outward movement of the switch activator and preventing activation of the switch when a shuttle fails properly to enter either box, the bias of each binder being more powerful than the bias of the switch activator.

6. A shuttle box construction for double shuttle looms comprising, upper and lower shuttle boxes, a movable shuttle binder for each box biased to move inwardly thereof into the shuttle path, a loom control switch associated with the boxes, a spring biased to move outwardly of the boxes to actuate the switch, and means projecting upwardly from the lower binder and downwardly from the upper binder for limiting the outward movement of the said spring and preventing actuation of the switch when a shuttle fails properly to enter either box.

7. A shuttle box construction for double shuttle looms comprising, upper and lower shuttle boxes, a movable shuttle binder for each box biased to move inwardly thereof into the shuttle path, a loom control switch associated with the boxes, a switch activator biased to move outwardly of the boxes positioned at a level intermediate the binders, and elements projecting upwardly from the lower binder and downwardly from the upper binder into the path of movement of the switch activator for limiting its outward movement and preventing activation of the switch when a shuttle fails properly to enter either box.

8. A shuttle box construction for double shuttle looms comprising, upper and lower shuttle boxes, a movable shuttle binder pivotally mounted near one end of each box, a spring bearing upon each binder to bias it to move inwardly of its box into the shuttle path, a loom control switch carried by the boxes adjacent the free ends of the binders, a switch activating spring mounted near the end of the boxes opposite the pivot of the binders and having its free end positioned and biased to move outwardly into contact with the switch, said switch activating spring being positioned at a level intermediate the binders, and overlapping elements projecting upwardly from the lower binder and downwardly from the upper binder into the path of movement of said switch activating spring for preventing the latter from contacting the switch when either binder is moved inwardly of its box by its spring, each binder spring having a more powerful bias than the bias of the switch activating spring.

9. A shuttle box construction for double shuttle looms comprising, upper and lower shuttle boxes, a movable shuttle binder for each box biased to move inwardly thereof into the shuttle path, a loom control switch associated with the boxes, a switch activator biased to move outwardly of the boxes, means carried by both binders for limiting the outward movement of the switch activator and preventing activation of the switch when a shuttle fails properly to enter either box, and means for limiting the pressure of the switch activator upon the switch.

10. A shuttle box construction for double shuttle looms comprising, upper and lower shuttle boxes, a movable shuttle binder for each box biased to move inwardly thereof into the shuttle path, a loom control switch associated with the boxes, a switch activator biased to move outwardly of the boxes, means carried by both binders for limiting the outward movement of the switch activator and preventing activation of the switch when a shuttle fails properly to enter either box, said switch comprising a casing and a plunger and the parts being so constructed and arranged that the switch activator contacts the switch casing after it has moved the plunger into switch closing position.

ANDREW J. DUFOURD.
FRANK A. LOVSHIN.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
2,499,887	Sullivan et al.	Mar. 7, 1950
2,556,785	Abbott	June 12, 1951
2,600,667	Mason	June 17, 1952